

Claims

1. A process for preparing a second compound stereo-selectively which process comprises reacting a substrate comprising at least one first
5 compound with a reagent in the presence of a biological catalyst and a solvent comprising at least one (hydro)fluorocarbon.
2. A process as claimed in claim 1, wherein the biological catalyst is an enzyme.
- 10 3. A process as claimed in claim 2, wherein the enzyme is a hydrolase.
4. A process as claimed in claim 3, wherein the enzyme is selected from the proteases and lipases.
- 15 5. A process as claimed in any one of claims 2 to 4, wherein the enzyme is part of a whole cell culture.
6. A process as claimed in claim 1, wherein the biological catalyst is an
20 abzyme.
7. A process as claimed in any one of the preceding claims, wherein the substrate is reacted to form an enantiomer at an enantiomeric excess of greater than 50 %.
- 25 8. A process of resolving a racemic mixture which process comprises reacting that mixture with a reagent in the presence of a biological catalyst and a solvent comprising at least one (hydro)fluorocarbon so as to

preferentially or selectively convert one of the enantiomers forming the racemic mixture into a new enantiomeric compound.

9. A process as claimed in claim 8, wherein the racemic mixture is a
5 mixture of R and S alcohols, R and S carboxylic acids, R and S carboxylic acid esters, R and S amino acid esters, R and S amines, R and S thiols or R and S amides.

10. A process as claimed in claim 9, wherein the racemic mixture is a
10 mixture of R and S amino acid esters or a mixture of R and S alcohols.

11. A process as claimed in claim 10, wherein the racemic mixture is a
mixture of N-P-dl-phenylalanine alkyl esters, where P denotes a protecting
group, and the reagent is an alkanol.

15 12. A process as claimed in claim 11, wherein the racemic mixture is a
mixture of N-acetyl-dl-phenylalanine propyl esters or a mixture of N-trifluoroacetyl-dl-phenylalanine propyl esters and the alkanol is methanol.

20 13. A process as claimed in claim 10, wherein the racemic mixture is a
mixture of 1-phenylethanols and the reagent is vinyl acetate.

14. A process as claimed in any one of claims 8 to 13, wherein the new
enantiomeric compound is formed at an enantiomeric excess of greater than
25 50 %.

15. A process as claimed in any one of claims 8 to 14, wherein the
biological catalyst is an enzyme.

16. A process as claimed in claim 14, wherein the enzyme is a hydrolase.

17. A process as claimed in claim 16, wherein the enzyme is a protease.

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18. A process as claimed in claim 17, wherein the enzyme is *Subtilisin carlsberg*.

19. A process of preparing a particular enantiomer preferentially or
10 selectively from a meso compound which process comprises reacting the
meso compound with a reagent in the presence of a biological catalyst and a
solvent comprising at least one (hydro)fluorocarbon.

20. A process as claimed in claim 19, wherein the meso compound is cis-
15 4-cyclopentene-1,3-diol and the reagent is an acyl donor.

21. A process as claimed in claim 20, wherein the acyl donor is an enol
ester.

22. A process as claimed in claim 20, wherein the acyl donor is vinyl
20 acetate.

23. A process as claimed in any one of claims 20 to 22, wherein the
reaction is conducted in the presence of a hindered amine.

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24. A process as claimed in claim 23, wherein the hindered amine is a
tertiary amine.

25. A process as claimed in any one of claims 19 to 24, wherein the particular enantiomer is formed at an enantiomeric excess of greater than 50 %.

5 26. A process as claimed in any one of claims 19 to 25, wherein the biological catalyst is an enzyme.

27. A process as claimed in claim 26, wherein the enzyme is a hydrolase.

10 28. A process as claimed in claim 27, wherein the enzyme is a lipase.

29. A process as claimed in claim 28, wherein the enzyme is *Porcine pancreatic lipase*, *Candida antarctica* B lipase or *Pseudomonas cepacia lipase*.

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30. A process of preparing a particular enantiomer preferentially or selectively from a prochiral compound which process comprises reacting the prochiral compound with a reagent in the presence of a biological catalyst and a solvent comprising at least one (hydro)fluorocarbon.

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31. A process as claimed in claim 30, wherein the prochiral compound is 2-ethylpropane-1,3-diol and the reagent is an acyl donor.

25 32. A process as claimed in claim 31, wherein the acyl donor is an enol ester.

33. A process as claimed in claim 31, wherein the acyl donor is vinyl acetate.

34. A process as claimed in any one of claims 30 to 33, wherein the particular enantiomer is formed at an enantiomeric excess of greater than 50 %.

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35. A process as claimed in any one of claims 30 to 34, wherein the biological catalyst is an enzyme.

36. A process as claimed in claim 35, wherein the enzyme is a hydrolase.

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37. A process as claimed in claim 36, wherein the enzyme is a lipase.

38. A process as claimed in claim 37, wherein the enzyme is *Pseudomonas cepacia* lipase.

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39. A process as claimed in any one of the preceding claims, wherein the solvent comprises at least one C₁₋₁₀ hydrofluoroalkane.

40. A process as claimed in claim 39, wherein the at least one C₁₋₁₀ hydrofluoroalkane is selected from the group consisting of difluoromethane (R-32), pentafluoroethane (R-125), 1,1,1-trifluoroethane (R-143a), 1,1,2,2-tetrafluoroethane (R-134), 1,1,1,2-tetrafluoroethane (R-134a), 1,1-difluoroethane (R-152a), 1,1,1,3,3-pentafluoropropane (R-245fa), 1,1,1,2,3,3-hexafluoropropane (R-236ea) and 1,1,1,2,3,3,3-heptafluoropropane (R-227ea).

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41. A process as claimed in claim 40, wherein the solvent comprises at least one of difluoromethane (R-32) and 1,1,1,2-tetrafluoroethane (R-134a).

42. A process as claimed in any one of the preceding claims, wherein the at least one (hydro)fluorocarbon is used in combination with a co-solvent.

5 43. A process as claimed in claim 42, wherein the co-solvent is halogen free.

44. A process as claimed in any one of the preceding claims, wherein the solvent is in the liquid state.

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45. A process as claimed in any one of the preceding claims, which is conducted in the presence of water at a level which is less than that required for the water to form a separate aqueous phase in the reaction system.

15 46. A process as claimed in claim 45, wherein the amount of water that is used is below the saturation level for the solvent.

47. A process as claimed in claim 45, wherein the amount of water that is used is less than 1 % by weight of water based on the total weight of the
20 solvent.

AMENDED CLAIMS

**[Received by the International Bureau on 26 August 2004 (26.08.2004);
original claim 1 replaced by amended claim 1,
original claim 45 cancelled,
original claims 2-44 unchanged (2 pages)]**

Claims

1. A process for preparing a second compound stereo-selectively which
5 process comprises reacting a substrate comprising at least one first
compound with a reagent in the presence of a biological catalyst and a
solvent comprising at least one (hydro) fluorocarbon which is conducted in
the presence of water at a level which is less than that required for the water
to form a separate aqueous phase in the reaction system.
- 10 2. A process as claimed in claim 1, wherein the biological catalyst is an
enzyme.
3. A process as claimed in claim 2, wherein the enzyme is a hydrolase.
- 15 4. A process as claimed in claim 3, wherein the enzyme is selected
from the proteases and lipases.
5. A process as claimed in any one of claims 2 to 4, wherein the
20 enzyme is part of a whole cell culture.
6. A process as claimed in claim 1, wherein the biological catalyst is an
abzyme.
- 25 7. A process as claimed in any one of the preceding claims, wherein the
substrate is reacted to form an enantiomer at an enantiomeric excess of
greater than 50%.
8. A process of resolving a racemic mixture which process comprises
30 reacting that mixture with a reagent in the presence of a biological catalyst
and a solvent comprising at least one (hydro) fluorocarbon so as to

42. A process as claimed in any one of the preceding claims, wherein the at least one (hydro) fluorocarbon is used in combination with a co-solvent.

5 43. A process as claimed in claim 42, wherein the co-solvent is halogen free.

44. A process as claimed in any one of the preceding claims, wherein the solvent is in the liquid state.

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45. A process as claimed in any one of the preceding claims wherein the amount of water that is used is below the saturation level for the solvent.

15 46. A process as claimed in any one of the preceding claims wherein the amount of water that is used is less than 1% by weight of water based on the total weight of the solvent.